2021-11-23

Putting nature centre stage? The challenges of 'mainstreaming' biodiversity in the planning process

Wilson, Olivia

http://hdl.handle.net/10026.1/18602

Putting nature centre stage? The challenges of 'mainstreaming' biodiversity in the planning process

Olivia Wilson

Published online: 23 Nov 2021.

Submit your article to this journal ⍐

Article views: 311

View related articles ⍐

View Crossmark data ⍐

Putting nature centre stage? The challenges of 'mainstreaming' biodiversity in the planning process

Olivia Wilson* ID

School of Geography, Earth and Environmental Sciences, Faculty of Science and Engineering, University of Plymouth, Plymouth, United Kingdom of Great Britain and Northern Ireland

This article explores how international biodiversity commitments (Aichi targets) made in 2010 have been incorporated into spatial planning policy in England. The article analyses the moral, scientific and instrumental arguments underlying the Aichi targets and how they are reflected in the National Planning Policy Framework for England, together with views on the spatial planning approach to biodiversity expressed by local actors in spatial planning. The article concludes that biodiversity has been 'mainstreamed' in English spatial planning policy, but with spatial variations in policy approach between protected sites and the wider countryside and urban areas and with responsibility for biodiversity enhancement in the wider countryside and urban areas relying mainly on local policy and instrumental arguments that are likely to lead to tensions over the 'replaceability' of nature. The concept of connectivity is identified as key to a successful biodiversity strategy, but challenges to achieving connectivity in practice are identified.

Keywords: biodiversity; spatial planning; England; Aichi targets; ecological modernization

1. Introduction

In recent years concerns over biodiversity loss have come to the fore, with growing evidence of increased rates of habitats loss and species extinctions at a global scale (Wilson 1989; DEFRA 2011a; Masood 2018). Despite its scientific origins, the use of the term biodiversity as a shorthand for 'biological diversity' has broadened beyond science and has entered the mainstream of sustainable development discourse (Francis and Goodman 2010). Biodiversity is widely recognized to refer to all habitats and species, and their interrelationships, at a variety of spatial scales, from the genetic level to ecosystems, and to the natural processes on which they depend (e.g. Lawton 2010; DEFRA 2011a). Biodiversity is also dynamic in that habitat and species composition and range change over space and time (Francis and Goodman 2010).

In 2010, the Convention on Biodiversity (COP 10) signatory countries signed up to five strategic goals and 20 targets (known as the Aichi targets), to be met by 2020. Targets one to four relate to better national governance of biodiversity; targets five to

---

ten focus on reducing human pressures on biodiversity and especially on specific types of habitats (forests, seas and coral reefs); targets 11 to 13 focus on safeguarding and protecting ecosystems and species more broadly; targets 14 to 16 seek to enhance the benefits of ecosystems to humans, while targets 17 to 20 aim to raise public awareness of biodiversity, protect indigenous knowledge and promote research. The overarching aim was to halt the global loss of biodiversity by 2020 by "mainstreaming biodiversity across government and society" in all signatory countries (UNEP 2010, 8). The use of the term 'mainstreaming' highlighted a policy shift from 'compartmentalism' of bio-diversity to seeing it as fully integrated with economy and society (Sarkki *et al*. 2016; Uetake *et al*. 2019). In 2015, The UN committed to halt biodiversity loss as one of its Sustainable Development Goals (UN 2015).

The next international Convention on Biodiversity (COP 15) is to be held in 2021 to review the Aichi targets and agree to a new post-2020 global biodiversity frame-work, with evidence that few, if any, of the Aichi targets will have been met (*Nature* 2020). The year 2021, therefore, is a relevant time to reflect on the impact that grow-ing national and international concern and calls for action are having on decisions about land use and biodiversity at national and local levels.

Spatial planning plays a key role in regulating land use change and therefore in pro-tecting biodiversity (Whatmore and Boucher 1993; Healey 2006). The spatial planning system in England is a plan-led discretionary system (Healey 2006). Local planning authorities (LPAs) are required to prepare a local plan for the development and use of land that includes strategic and local policies and site-based allocations for development, as well as identifying protected areas. Each LPA covers a local government administra-tive area. The local plan is the primary consideration when determining planning appli-cations, but under the discretionary system other material considerations can also be relevant (Whatmore and Boucher 1993). The introduction of sustainable development as a planning policy principle in the early 1990s introduced biodiversity as a material con-sideration (Owens 1994). Since 2004, spatial planning has had the statutory purpose of contributing to the achievement of sustainable development (Healey 2006).

Previous research on spatial planning and biodiversity (e.g. Wilson 2009) has iden-tified the influence of international action in pressurizing national governments to adopt new spatial planning policies. Cowell and Lennon (2014) examined the link between 'knowledge' and 'action' in environmental decision-making. They found that while official policy documents at international and national levels create an institu-tional discourse that frames and shapes local action, local actors can act as policy entrepreneurs and shape national policy through innovative local policy. Sarkki *et al*. (2016) analyzed the implementation of the Aichi targets in Finnish national biodiver-sity policy, calling for more research into what the 'mainstreaming' of biodiversity means in different national and sectoral contexts.

This paper seeks to add to this body of research by exploring how the international Aichi targets are reflected in national spatial planning policies for biodiversity in England and considering the implications for the local level. In the UK, nature conser-vation and spatial planning are devolved matters, meaning that each nation has its own statutory and policy frameworks (DEFRA 2007). The UK has claimed to be a world leader in protecting its biodiversity (DEFRA 2011a). However, biodiversity loss in the UK has continued despite international and national commitments (Rose *et al*. 2018; DEFRA 2019). Three questions are addressed in the paper. First, how are the Aichi targets reflected in the English spatial planning framework? Second, how central, or

mainstream, has biodiversity become to the planning system in England, and what does that mean for biodiversity in different spatial contexts? Third, what are the challenges involved in 'mainstreaming' biodiversity in spatial planning policy? To address these questions, a discourse approach is adopted (Hajer 1995). A discourse approach is particularly relevant to analyzing biodiversity policy as the term 'biodiversity' itself can be seen as a shorthand concept for a complex set of problems and challenges. Discourse analysis can, therefore, explore the complex institutional understandings, justifications and responsibilities expressed in biodiversity policy.

The focus of this paper is the National Planning Policy Framework (NPPF) that "sets out the Government's planning policies for England and how these should be applied" (MHCLG 2019, para. 1). It provides the national spatial planning framework for local plan policies and for individual planning decisions for all LPAs in England, and planning policies and decisions must be in conformity with it. The NPPF was first published in 2012 and revised in 2019 (MHCLG 2019). This analysis focuses on the 2019 framework. A comparison with the 2012 version found that the 2012 biodiversity policy statements have been carried forward with only minor changes in wording (which if anything have strengthened biodiversity protection).

The paper is structured as follows: Section 2 explores biodiversity as a discourse and discusses key storylines used to justify the protection and enhancement of biodiversity that have been identified in research; Section 3 provides an overview of nature conservation policy in England to provide context for the analysis; The methods of analysis and data sources are then explained in Section 4; Section 5 presents the analysis and discussion of how spatial planning policy for biodiversity in England responds to and interprets the Aichi targets. The paper concludes with reflections on the opportunities and challenges for the spatial planning system in England to mainstream biodiversity, and makes recommendations for future policy, practice and research.

2.   Arguments for biodiversity

The emergence of sustainable development as an overarching principle guiding environmental policy is widely viewed as an ecological modernization discourse (Hajer 1995; Harvey 1999). A discourse can be defined as a socially constructed definition of a policy concern (after Hajer 1995). A discourse, or set of discourses, consist of arguments, narratives or storylines, often using metaphors to simplify and convey complex ideas, which are used to justify and legitimize courses of action. Analysis of policy discourse seeks to identify, through examination of storylines presented in policies, the dominant institutional understandings of the physical and social world. Policy discourses reflect and are influenced by particular institutional, geographical and cultural contexts, both past and present (Hajer 1995). Ecological modernization discourse argues for environmental protection and enhancement alongside economic and social development (a 'win-win' scenario). Within this broad framework, however, arguments for biodiversity draw on a number of philosophical and ethical positions, both anthropocentric (human-centred) and more ecocentric (nature-centred).

A moral ethic of partnership within sustainable development discourse has been identified (e.g. Merchant 1999), which argues that society as a whole has a duty to take action to protect biodiversity. Francis and Goodman (2010) refer to biodiversity as a 'post normal' science due to the recognition that tackling biodiversity decline is a shared responsibility. This argument of shared responsibility could be criticized, however, as an

'environmental fix' to offload responsibility for nature from the (national) state to the private sector, civil society and the local state (Castree 2008, 149).

Science plays a central role in biodiversity policy nevertheless by providing the objective evidence on which to base and monitor strategies and policies (Figari 2012). Despite this role, however, many authors recognize that science holds a problematic position in policy-making, as scientific acknowledgement of uncertainty and complexity sits uncomfortably with policy-makers who seek certainty and simplicity (Wynne 1992; Hajer 1995; Figari 2012). Policymakers also tend to selectively draw on scientific findings to fit particular storylines, ignoring other, conflicting science (Keulartz 1999).

Scientific arguments underlie the 'compartmentalized' approach to nature conservation based on designation of key sites, with the rarest species and habitats seen as the most scientifically valuable for nature conservation and worthy of the greatest protection (Owens 1994; Cowell 1997; Lawton 2010; Francis and Goodman 2010). 'Irreplaceable' nature has come into use as a term to describe habitats that, once lost, cannot be replaced due to the length of time they would take to re-establish (Wilson 1989; Healey 2006; Lawton 2010). These arguments can be seen as ecocentric, in that they argue to the protection of nature based on its innate ecological value as opposed to material benefit to humans.

A recent scientific concept to enter policy discourse is that of habitat connectivity (Keulartz 1999). Arguments for greater connectivity of protected sites (using the metaphors of 'corridors', 'networks' or 'stepping stones') are based on scientific recognition that species and habitats need space to survive and adapt, and that geographical corridors between sites are "essential for the migration, dispersal and genetic exchange of wild species" (Lawton 2010, 27). Ecological networks have been hailed as "one of the most significant strategic developments in conservation in recent times" (Lawton 2010, 15). The term 'green infrastructure' (GI) also feeds into the 'connectivity' narrative (Wilson and Hughes 2011; Lennon and Scott 2014).

Connectivity features may be linear corridors (such as rivers or hedgerows) or discontinuous, non-linear elements, in which case the metaphor 'stepping stone' is more relevant. Natural England (2012, 23) identified the following functional components of an ecological network (recognizing that components may overlap spatially): core areas (protected sites); corridors and stepping stones (connections); restoration areas for (re)creation of habitats; buffer zones (to reduce pressures on core areas) and surrounding land (e.g. farmland, forestry, urban areas). A focus on connectivity can include a range of spatial scales, from individual sites to a 'landscape scale', 'ecosystem' or even 'bioregional' scale (Cowell and Lennon 2014; Campbell 2016).

In ecological modernization discourse, the strongest arguments for biodiversity are anthropocentric arguments relating to the material and utilitarian (economic and social) benefits of nature to humans (Dryzek 1997; Bailey and Wilson 2009). These can be termed 'instrumental' arguments and are particularly prominent in spatial planning discourse (Healey 2006; Castree 2008; Rose *et al*. 2018). Instrumental concepts that have entered spatial planning discourse under the framework of sustainable development include biodiversity 'mitigation', 'offsetting' and 'net gain'. Mitigation refers to minimizing harmful biodiversity impacts while offsetting refers to compensation for, or replacement of, lost habitat, either on site or off site (Baker, Hoskin, and Butterworth 2019). The argument for biodiversity mitigation and offsetting is based on the polluter pays principle (DEFRA 2014). Net gain implies that the 'stock' of replaced biodiversity post-development is higher than before development (Sullivan and Hannis 2015;

Apostolopoulou and Adams 2019). Lawton (2010, 86) argued for the introduction of a systematic approach to biodiversity offsetting in planning policy, "to compensate for residual and unavoidable harm to existing wildlife sites caused by development activity". Offsetting and net gain have been described as enabling a comprehensive 'full coverage' approach to managing the impact of development on nature conservation and landscape in the wider countryside and urban areas (Albrecht, Schumacher, and Wende 2014).

Both offsetting and net gain are based on the instrumental assumption that biodiversity value can be quantified, so that losses and gains can be compared, a view that has been strongly criticized (Owens 1994; Cowell 1997; Apostolopoulou and Adams 2019). Sullivan and Hannis (2015) have questioned whether nature ever can be 'replaced', while Lawton (2010, 86) warned that biodiversity offsetting should not become a "licence to destroy" or damage existing habitat of recognized value.

The instrumental term 'ecosystem services' has been coined to refer to the many material benefits that ecosystems can provide to humans, both environmental, social but also economic, such as carbon storage, flood protection and air quality as well as health and wellbeing (Lennon and Scott 2014; Costanza *et al.* 2017). Campbell (2016) and others have highlighted the spiritual and wellbeing benefits of nature to humans (based on nature's intrinsic value) but also on the recognized health benefits of outdoor exercise. Similarly, the term 'natural capital' seeks to place an economic value on nature and the human services it provides (Owens 1994). The emphasis on commodifying nature as an environmental good has been criticized as the 'neoliberalisation' of nature or 'free market environmentalism' (Castree 2008).

Both instrumental and scientific arguments tend to use technical, quantitative evidence to support their case. The role of evidence is key to developing spatial planning policies and justifying decisions (Cowell 1997; Healey 2006). Planning policy draws largely on scientific or technical arguments that are often complex and challenging for the general public to understand (Cowell 1997; Healey 2006). Bailey and Wilson (2009) discussed how scientific/instrumental arguments are often used to 'depoliticise' environmental issues and to present them as technical questions. Biodiversity policy, therefore, lends itself to the technical discourse already established within planning practice.

3. Nature conservation policy in England

Nature conservation policy in England has traditionally followed a hierarchical, compartmentalized, site-based approach, with sites protected for their ecological significance and rarity, although landscapes have long been valued for their intrinsic natural beauty (Whatmore and Boucher 1993; Owens 1994; Francis and Goodman 2010; Lennon and Scott 2014).

Lawton, in his influential review of the effectiveness of nature conservation policy in England, identified three 'tiers' of nature conservation sites, as outlined in Table 1, based on the biodiversity importance of the sites and their degree of statutory protection. The most important sites benefit from the greatest protection (Lawton 2010; Rose *et al.* 2018). The tiers add up to a maximum of 32% of the land area of England, but in reality cover less land area (estimated at 28%), as many tier 1 and 2 sites will be located ('nested') within larger tier 3 sites (Natural England 2012). Tier 1 and 3 sites are protected by legislation and are known as statutory sites. The legal status of tier 1

Table 1. Tiers of protected nature conservation areas in England (after Lawton 2010; Natural England 2012, n.d.).

Tier	Designation	Numbers of sites in England	Regulation (date introduced)
Tier 1: Statutory nature conservation sites – whose primary purpose is nature conservation and which have a high level of protection	International: Ramsar Sites (Internationally important wetlands)	71 sites	Convention on Wetlands of International Importance (1971)
	European: Natura 2000 sites (habitats sites) including: Special Protection Areas (SPAs – areas of importance for rare or vulnerable bird species and migratory species) and Special Areas of Conservation (SACs)	79 SPA sites 240 SAC sites	EU Birds Directive (1979) EU Habitats Directive (1992) The Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales.
	National: Sites of Special Scientific Interest – SSSIs National Nature Reserves – NNRs	289 SSSIs 224 NNRs	National Parks and Access to the Countryside Act (1949) Wildlife and Countryside Act (1981) Countryside and Rights of Way Act (2000)
	Local: Local Nature Reserves (LNRs)	2,500 LNRs (approx.)	National Parks and Access to the Countryside Act (1949)
Tier 2: Non-statutory protected habitats and sites which are designated for their high biodiversity value	County Wildlife Sites Local Wildlife Sites (various terminologies)	Unknown	
Tier 3: Statutory designations for landscape and nature with wildlife conservation as part of their statutory purpose	National Parks Areas of Outstanding Natural Beauty (AONBs)	10 46	National Parks and Access to the Countryside Act (1949) Environment Act (1995)
Priority species and habitats (not site dependent)	Section 41 (S41) list identifies priority habitats and species of principal importance for the conservation of biodiversity	40 terrestrial habitat types and 865 species	Natural Environment and Rural Communities Act (2006)

sites for nature conservation is set out in international and/or national law. In the case of tier 3 sites, their statutory purpose is nature conservation but also landscape protection and recreation. The tier 2 sites do not enjoy statutory protection (hence are non-statutory). The S41 list (see Table 1) provides legal protection for important (priority) species and habitats whether they are found within or outside designated sites.

Impetus to increase the number of protected nature conservation sites and to strengthen their level of protection has come from the international/European Union (EU) level from the 1970s onwards, as illustrated in Table 1. Protection for certain tier 1 sites has strengthened as a result of the EU Birds and Habitats Directives and associated UK regulations, creating a gap between strong protection of these so-called 'habitats sites' and weaker protection of other tier 1, 2 and 3 sites. Under EU law, strict procedures have to protect the tier 1 habitats sites during local plan-making stages, including a statutory requirement to carry out a Habitat Regulation Assessment (HRA) of any plan or project that might have a detrimental impact on the integrity of a designated habitats site (Therivel 2009).

In response to the Aichi targets, the UK government published *Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services* (DEFRA 2011b) which identified national key priorities and actions in relation to each target. A government White Paper issued in the same year set out actions to "mainstream the value of nature" (DEFRA 2011a, 3). Following the Brexit vote in 2016, the government published a post-Brexit plan for the environment: *A Green Future: Our 25 Year Plan to Improve the Environment* which reaffirmed the government's commitment to the Convention on Biological Diversity (DEFRA 2018).

In 2020, the government introduced a draft Environment Bill which will provide a post-Brexit regulatory framework for environmental policy (Condon 2020). The draft Bill proposes the introduction of a mandatory biodiversity net gain requirement of at least 10% for new developments, using a biodiversity metric as a standardized measurement tool. It also includes a requirement for appointed responsible authorities to prepare local nature recovery strategies (LNRS) to which LPAs will be required to have regard to in local plans and decisions (Condon 2020).

4. Methods

The Aichi targets that are most relevant for spatial planning were identified from an analysis of the national *Biodiversity 2020* strategy (DEFRA 2011b). Of the twenty Aichi targets, five were identified within the strategy as of particular relevance for the spatial planning system (targets 4, 5, 11, 12, 14). For this analysis, a further four targets have been identified that relate to spatial planning more broadly: targets 1, 2, 15 and 19. These nine targets will be the focus of analysis. The Aichi goals and nine selected targets are presented in Table 2, together with the key priorities and actions in relation to each Aichi target that are contained in the national strategy.

Each target has been classified in Table 2 according to whether it expresses a moral, scientific or instrumental storyline (as discussed in Section 2). Some targets contained two storylines, highlighting that the arguments overlap in complex ways. Discourse analysis was carried out of the nine Aichi targets, national strategies for biodiversity and national spatial planning policy. Three national strategies were analyzed (DEFRA 2011a, 2011b, 2018) together with the NPPF (MHCLG 2019). Key words associated with each story-line were identified (see Table 2). NVivo was used as a

Table 2. Aichi targets, national strategy and spatial planning response (after UNEP 2010; DEFRA 2011b; MHCLG 2019).

Aichi strategic goal	Aichi target	Justification	Key words	National response: key priorities and actions	National spatial planning response
A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.	1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes.	Moral	Responsibility Duty Obligation Nature's intrinsic/ innate value	Key priority: Putting people at the heart of biodiversity policy. Action: Increase awareness of the value of biodiversity. Action: Promote better decision-making to better take account of the values of biodiversity. Action: Provide tools to help consider a wider range of ecosystem services.	Assessment of ecological value reflects hierarchy of protected sites.
	4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption.	Moral	Shared Partnership	Action: Increase the number of people taking positive action for biodiversity.	Strategic cooperation between LPAs for protected sites and connectivity.
		Instrumental	Sustainable development	Action: Take a strategic approach to planning for nature within and across local areas to guide development to the best locations, encourage greener design and enable development to enhance natural networks. Action: Retain the protection and improvement of the natural environment as core objectives of the planning system.	Sustainable development as fundamental purpose of planning; two-pronged approach to planning for biodiversity for protected sites and elsewhere.

Table 2. (*Continued*).

Aichi strategic goal	Aichi target	Justification	Key words	National response: key priorities and actions	National spatial planning response
B: Reduce the direct pressures on biodiversity and promote sustainable use.	5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	Scientific	Loss Fragmentation Net gain Offsetting	Key priority: Reducing environmental pressures. Action: Expand the area of woodland. Action: Establish a voluntary approach to biodiversity offsets.	Apply biodiversity mitigation hierarchy to achieve net gain from development.
C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.	11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.	Scientific	Irreplaceable Habitats Connectivity Ecological networks	Action: Establish ecological networks.	Protection for designated sites (in accordance with hierarchy); protection of irreplaceable and priority habitats. Connectivity of sites.
	12: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	Scientific	Threatened Priority Rare At risk Species Wildlife	Key priority: A more integrated large-scale approach to conservation on land and sea. Action: Target recovery of priority species. Action: Establish ecological	Protection for priority species.

Table 2. (*Continued*).

Aichi strategic goal	Aichi target	Justification	Key words	National response: key priorities and actions	National spatial planning response
D: Enhance the benefits to all from biodiversity and ecosystem services.	14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and wellbeing, are restored and safeguarded.	Instrumental	Health and wellbeing. Ecosystem services Natural capital Green infrastructure	networks. Action: Safeguard ecosystem services. Action: Expand the area of woodland.	Accessible green infrastructure. Multi-functional green spaces for biodiversity, drainage, recreation, landscape, air and water quality, health and wellbeing.
	15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	Instrumental	Climate change Carbon storage/ stocks		Role of biodiversity and green infrastructure in carbon storage, climate change adaptation and mitigation.
E: Enhance implementation through participatory planning, knowledge management and capacity building.	19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	Scientific	Evidence	Key priority: Improving our knowledge. Action: Monitor changes in the state of biodiversity and also the flow of benefits and services it provides.	Evidence base to justify policies.

tool to query the texts using the key words, and to code strategy statements and the NPPF policies to the relevant storylines associated with each target. This approach enabled a structured analysis and comparison of the documents to be carried out.

The textual analysis is supplemented with practitioners' views on biodiversity in spatial planning policy and practice. Seven semi-structured interviews were conducted in 2018 and 2019 with local authority planners and other actors working in Devon and Cornwall in South West England. They were selected for their expertise in developing spatial policies for biodiversity or green infrastructure, or for their involvement with biodiversity mitigation and offsetting in large urban developments. The interviewees are referred to by a letter to preserve their anonymity. They include three spatial planners from LPAs in Devon (respondents A, B and C), two private consultants working on a large urban development in Devon (respondents D and E), an officer from Natural England covering Devon and Cornwall (Respondent F) and a developer involved with a large urban development in Cornwall (Respondent G). Interview transcripts and notes were analyzed and coded to the Aichi target storylines. Rather than focus on the specific local spatial planning context of Devon and Cornwall, however, this paper draws on comments made about biodiversity and green infrastructure that reflect local views of national policy. It should be emphasized that the quotes presented in this analysis are snapshots of the views of a small sample of local actors in one location in England and should not be taken as more widely representative of local planners and associated actors.

5.   'Mainstreaming' biodiversity in English spatial planning policy

The analysis of biodiversity policy discourse in this section broadly follows the structure set out in Table 2. Aichi targets 1 and 2 refer to 'biodiversity values' and the need to raise awareness of and integrate these values at the national and local levels, although which 'values' are not specified. The national strategies, however, justify the approach to biodiversity on the grounds of a moral obligation to protect nature's innate or intrinsic value, "Most people rightly believe in the innate value of nature and our strong moral responsibility to protect it" (DEFRA 2011a, para. 1.1); "Biodiversity is important for its own sake and has its own intrinsic value" (DEFRA 2011b, para. 1.1); "We value wildlife in its own right" (DEFRA 2018, 58). These statements can be seen as high level moral justifications for action, but need to be considered alongside the other Aichi targets.

The reference to sustainable production and consumption in Aichi target 4 clearly fits within the ecological modernization discourse of sustainable development. This 'win-win' view of the compatibility of biodiversity enhancement and development is reflected in the national strategies, where spatial planning is identified as playing a key role (this is the only target where the government specifically references spatial planning as an action), "Development is needed so that communities can grow and expand in a way which suits them and to provide jobs and essential services, but it also has a contribution to make to our overall objective of no net loss of biodiversity" (DEFRA 2011a, 22); "The Government expects the planning system to deliver the homes, business, infrastructure and thriving local places that the country needs, while protecting and enhancing the natural and historic environment" (DEFRA 2011b, 27).

Sustainable development is a fundamental principle of the spatial planning approach (reflecting the statutory purpose of spatial planning), "Achieving sustainable

development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives)" (MHCLG 2019, para. 8). A commitment to help 'improve biodiversity' is included as part of the environmental objective of sustainable development (MHCLG 2019). Biodiversity is, therefore, recognized as one of the overarching environmental considerations that guide planning policies and decisions, along with economic and social objectives.

The "presumption in favor of sustainable development" (MHCLG 2019, para. 11) has been interpreted as prioritizing housing development over social and environmental considerations (Bradley 2021). The principle is qualified, however, by a footnote in the NPPF that specifically refers to locations where the "overall scale, type or distribution of development" should be restricted, these being tier 1 habitats sites, SSSIs, AONBs, National Parks and irreplaceable habitats (MHCLG 2019, para. 11 footnote 6). The 'presumption', therefore, distinguishes between protected sites on the one hand, where biodiversity and landscape considerations are predominant, and urban areas and the wider countryside on the other, where they are more balanced. It is, therefore, relevant to examine what this two-pronged approach means for, firstly, the protected sites and, secondly, for the wider countryside and urban areas in the context of the other targets.

Aichi target 11 puts forward a scientific argument to protect ecologically valued habitats. The reference to connectivity reflects the scientific view that connectivity of sites is key to enhancing biodiversity. The national strategies support this target by reinforcing the focus on the special, important or most at risk habitats and species, "We will continue to look after and improve our special wildlife areas and take direct action to support our most precious and endangered wildlife" (DEFRA 2011a, 17).

The requirement for spatial planning to protect the hierarchy of designated sites and support connectivity between them is stated in the NPPF, where plans should "Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them" (MHCLG 2019, para. 174a).The implications of the hierarchy are explained further in the following policy that addresses policy objectives for valued landscapes, biodiversity and the countryside, "Planning policies and decisions should contribute to and enhance the natural and local environment by a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognizing the intrinsic character and beauty of the countryside" (MHCLG 2019, para. 170). In planning policy, therefore, the 'value' of biodiversity is dependent on its statutory status and recognized ecological quality within the hierarchy of protected sites (as shown in Table 1), although the intrinsic aesthetic value of landscape character and the beauty of the countryside are also recognized.

For the tier 1 habitat sites (see Table 1), the role of EU law in strengthening their policy protection was recognized in the interviews. Respondent B noted that the requirement to carry out a Habitats Regulation Assessment (HRA) of any plan or policy affecting a habitats site is taken seriously by policy-makers and local politicians at the local plan-making stage, because an objection from Natural England (a statutory consultee in relation to habitats sites as well as SSSIs, National Parks and AONBs) to a proposed plan's impact on a habitats site could prevent a plan from being adopted:

"it is the most rigorous process in terms of being clear about what you need to achieve for it [the local plan] to become acceptable with Natural England and if that's not fulfilled then … because there are parts of the country aren't there that have had to say there's no development until they get their mitigation strategy in place." (Respondent B)

Respondent F stated that Planning Inspectors (who are responsible for examining local plans) "take note" if Natural England objects to a plan's potential impact on a habitats site. Many of England's tier 1 habitats sites cross local authority administrative boundaries, which has led to cooperation between local authorities over their protection (an example of shared responsibility reflecting Aichi target 4). Local authority partnerships have developed to coordinate the protection and management of these sites (e.g. Bird Aware Solent 2017). The Thames Basin Heaths partnership (Thames Basin Heaths Joint Strategic Partnership Board 2009) is seen as a leader in planning for tier 1 habitats sites (Therivel 2009). It developed an approach to mitigating recreation impacts arising from planned development by proposing suitable alternative natural green space sites (SANGs), together with enhanced management of the habitats sites. Both mitigation strategies are funded by financial contributions arising from new development, and this approach is now commonly used by other authorities responsible for habitats sites. The important role of SANGs as a mitigation strategy was recognized in the interviews:

"It's recognised by Natural England as an acceptable mitigation strategy as you're offsetting the trips by providing an alternative, and I don't think there's that many other mitigation approaches out there." (Respondent B)

"The SANGs element has come forward a lot more strongly so you probably see a slightly different approach developing … which follows Natural England guidance." (Respondent D)

Overall, the spatial planning approach for tier 1 habitats sites is characterized by strong scientific arguments, strong regulation and national policy, and effective strategic partnerships at the sub-regional and local levels with a clear and effective approach to mitigation of impacts. The other tier 1 sites (the SSSIs that are not designated habitat sites) are protected by regulation and strong national spatial planning policy, but LPAs are less likely to work in a strategic way with neighboring authorities to prevent or mitigate development impacts. The protection of LNRs, the other tier 1 sites, however, is subject to weaker regulation and NPPF policy and is therefore more reliant on local policy for protection.

Protection of the tier 2 non-statutory sites is also relegated to the local plan level in the NPPF. Their protection is further complicated by the variety of terminology used for local wildlife sites including County Wildlife Sites, Sites of Importance for Nature Conservation (SINCs) and Sites of Nature Conservation Importance (SNCIs) (DEFRA 2006). There are a variety of organizations that manage these sites, many being wildlife or landscape trusts (Francis and Goodman 2010). The localized approach to LNRs and tier 2 sites was recognized in the interviews:

"… the NPPF requires you to map your overarching networks … where the stepping stones … where wildlife move between, so we'll be certainly doing that. And part of those smaller sites might make up a wider network in themselves, so in that way they'll

be identified but … we probably won't be looking into going into too much detail in terms of how we're protecting them … we'd expect that to come through the local authority level." (Respondent A - commenting on development of a strategic policy for GI covering a number of LPAs)

The tier 3 sites (National Parks and AONBs) are referred to in the NPPF in relation to their "landscape and scenic beauty" as well as their "wildlife and cultural heritage". The NPPF states that, "the scale and extent of development within these designated areas should be limited" (MHCLG 2019, para. 172). Therefore, in tier 3 sites, development is discouraged but not excluded (outside the 'nested' tier 1 sites). The legislation for tier 3 sites is stronger for landscape preservation than for biodiversity protection and this tilted balance is reflected in national planning policy.

The approach to planning for biodiversity in the wider countryside and urban areas outside designated sites is more complex and challenging but essential for the 'mainstreaming' of biodiversity. Aichi target 5 refers to reducing the rate of loss of natural habitats. National strategies include a broad aim to, "arrest the decline in habitats and species" (DEFRA 2011a, 68).

How planning policy should seek to halt or reverse the decline in biodiversity outside the protected sites is set out in the following policy, " … opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity" (MHCLG 2019, para. 175d). Spatial planning policy therefore adopts the ecological modernization storyline that development is compatible with biodiversity net gain. Further policy statements expand on how biodiversity is to be balanced with development, with reference to the mitigation hierarchy, "if significant harm to biodiversity resulting from a development cannot be avoided … adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused" (MHCLG 2019, para. 175a). This policy statement implies that harm to biodiversity can be objectively assessed and that nature can be 'replaced', a position that has been widely criticized, as highlighted in Section 2.

The government's intention to make biodiversity net gain for major developments mandatory in the Environment Bill using a quantified metric was given a qualified welcome in the interviews:

"so the net gain's definitely a start, so making that mandatory I think is definitely a good move … we probably need to go further, whether it's going to stop the overall trend in loss of wildlife I doubt it … and the impacts of climate change are going to make it considerably worse." (Respondent A)

One example of where harm to biodiversity is unacceptable is in relation to priority habitats and species. Aichi target 12 refers to the goal of protecting threatened species. This goal is reflected in national strategies with reference to moral responsibility, "Greatest priority will be given to species at most risk of extinction, and those for which England has a particular international responsibility" (DEFRA 2011b, 21). The focus on protection of priority habitats and species is recognized in planning policy with reference to the S41 list (see Table 1) but in a way that links their conservation to net gain and connectivity (an ecological modernization storyline), stating that plans should "promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify

and pursue opportunities for securing measurable net gains for biodiversity" (MHCLG 2019, para 174 b).

Alongside the protection of priority habitats and species is a concern to protect 'irreplaceable' habitats. One example of a habitat identified as irreplaceable in the NPPF is ancient woodland, where the NPPF sets out a seemingly clear policy position, "Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists" (MHCLG 2019, para. 175c). Ancient woodland is defined as an area that has been continuously wooded since 1600 (DEFRA 2005; Goldberg *et al.* 2007). A third of England's woodland is estimated to be ancient in origin but ancient woodland has been in decline (DEFRA 2011a). It does not enjoy statutory protection (unless part of a tier 1 or 3 site), however, and it is not listed as a priority habitat *per se* in the S41 list (although the S41 list includes specific types of woodland habitat). Ancient woodland is, therefore, a broad umbrella term for a variety of woodland habitats (Goldberg *et al.* 2007). As with tier 2 sites, protection of smaller ancient woodland sites is dependent on having strong policy at the local level. Without an effective local policy, small pockets of ancient woodland may be lost to development, despite the NPPF policy. The example of ancient woodland shows that arguments about what nature is 'replaceable' and what is 'irreplaceable' will lead to conflicts in practice playing out at the local level due to a lack of clear national policy or regulation.

Connectivity is a concept that is key to delivering biodiversity protection and enhancement, but that lacks a clear approach in national planning policy. The focus on connecting protected sites through corridors and stepping stones could be seen as a new tier of nature conservation, a 'fourth tier' (after Lawton 2010). Aichi target 11 refers to connectivity of habitats and national strategies also recognize the link between biodiversity protection and connectivity of sites, "Ecological networks are considered to be an effective means to conserve ecosystems and wildlife in environments, such as England, that have become fragmented by human activities" (DEFRA 2011b, 13).

The NPPF encourages LPAs to map ecological networks, wildlife corridors and stepping stones in their local plans (MHCLG 2019, para. 174a). This policy is potentially significant, as mapping these sites means that they take on a spatial definition that gives them a physical reality (Wilding and Raemaekers 2000; Cowell and Lennon 2014). Respondent C, for example, referred to the Clyst Valley Regional Park as an example of a major new GI corridor in East Devon that is mapped in the East Devon Local Plan (East Devon District Council 2016). Given that most connectivity sites are not designated sites, however, and many will be privately owned land, it will be a challenging task for LPAs to map existing or proposed connectivity sites in local plans. In the interviews, Respondent A felt that site allocations for GI in local and strategic plans should be as specific as possible. Respondent B, however, noted the need for flexibility in spatial allocations, where boundaries of proposed GI, SANGs or other connectivity features may not yet be determined when a local plan is adopted.

The enhancement of biodiversity through better connectivity between sites will also require LPAs to follow a strategic, planned approach to offsetting, as identified by Lawton (2010) and proposed in the draft Environment Bill with the requirement for LNRS (Condon 2020). However, it is likely that developers will resist any approach that makes delivery of development more costly or more uncertain for them.

Respondent D, referring to provision of SANGs as part of a major urban development in Devon, felt that developers prefer to provide on-site mitigation and compensation as they then have control over what is provided:

"Certainly they've tried to be self-sufficient in terms of their SANGs provision here … because then they have a known … and are able to say 'yes – we can deliver this'. Then they have control of it".

Aichi target 4 argues that the protection of biodiversity is a shared problem and shared moral responsibility (adopting the partnership ethic). National strategies similarly refer to the need for partnership and recognize the need for cooperation within spatial planning, "Delivery of the Plan will require sustained and committed effort not just from government but from organizations and individuals across our nation" (DEFRA 2018, 151); "We need a more strategic and integrated approach to planning for nature within and across local areas" (DEFRA 2011a, 21). Spatial planning policy refers to the need for LPAs to work together on a strategic level to plan for nature and landscape conservation across local authority boundaries, "Strategic policy-making authorities should collaborate to identify the relevant strategic matters which they need to address in their plans" (MHCLG 2019, para. 25) while plans should " … plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries" (MHCLG 2019, para. 171).

The benefits of strategic cooperation were recognized in the interviews:

"There's lots of opportunities for covering the bigger areas and there's lots of reasons why that would bring benefits, because nature does not know the boundaries for our local authorities." (Respondent B)

Further advantages of a joint approach are that LPAs can develop a shared evidence base (pooling resources, expertise and costs) and can coordinate planning policy and procedures. It should lead to a more consistent approach to decision-making and can draw on the different strengths of participating local authorities (as noted by Respondent A). Respondent F pointed out that a strategic approach gives developers more certainty about the expected development costs of ecological mitigation in different LPAs. However, the challenges of joint working are significant. Individual LPAs will have their own local nature conservation priorities and policy approaches as recognized in the interviews by planners working on the development of a strategic plan covering a number of LPAs in Devon:

"there's the challenge that people like having their own bespoke local policy, and they feel like … whether a strategic policy will have the same level of detail that they like within their local policy that they've got at the moment." (Respondent B)

Plan-making timetables will vary between authorities, making policy alignment difficult. Changes in local political priorities following local elections can disrupt plan-making timetables and change policy discourse, including in relation to biodiversity,

"we had quite a churn in terms of councillors and it meant that a lot of our preparatory work with the councillors … they've now departed and we've got new councillors so it's … we're trying to take stock while we brief the councillors and reopen some of the

conversations about the scope and purpose … because they've potentially got different priorities." (Respondent B)

Aichi targets 14 and 15 put forward instrumental arguments for biodiversity, linking biodiversity to wider material objectives associated with an ecological modernization discourse. Target 14 contains the goal of enhancing ecosystems to provide ecosystem services, including health and wellbeing. The national strategies recognize nature's intrinsic importance for health, "We gain non-material benefits from ecosystems, for example: through spiritual or religious enrichment" (DEFRA 2011a, p8) and "Spending time in the natural environment – as a resident or a visitor – improves our mental health and feelings of wellbeing" (DEFRA 2018, 71). A more utilitarian argument is also made, " … regular opportunities to experience natural environments have quantifiable positive impacts on our mental and physical health" (DEFRA 2011b, 15). This utilitarian view is reflected in spatial planning policy, where the importance of open spaces (and GI) for health is recognized, "Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities" (MHGLG 2019, para. 96) while stating that planning policies and decisions should "enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure" (MHCLG 2019, para. 91). In the interviews, this utilitarian view of planning's role in promoting health was recognized,

> " … even doing just a bit of activity … walking more regularly … has a huge impact in reducing early onset cancers and all of this kind of thing … that then has a huge drain on the NHS … so it's really big and I think as budgets get more and more constrained there will be a greater role for GI to play." (Respondent A)

Target 14 also refers to other 'essential services' that ecosystems provide. The economic benefits of ecosystem services are highlighted in national strategies, "Maintaining nature's capacity to provide the functions upon which we rely is often cheaper than having to replace them by investing in heavy infrastructure or technical solutions" (DEFRA 2011a, 11). Spatial planning policy acknowledges the economic benefits of ecosystem services, arguing that planning policies and decisions should recognize "the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland" (MHCLG 2019, para. 170 b).

The emergence of ecosystem services as a policy objective presents a challenge for planning for biodiversity in the wider countryside, due to the number of environmental objectives contained within the concept. Biodiversity becomes only one of several environmental objectives which need to be weighed up against each other. The presence of a priority species on a site, for example, will raise the site's biodiversity importance in relation to other ecosystem services, but elsewhere biodiversity may be given a lower priority as the following example illustrates,

> " … we've got quite a few dormice across the area so we work quite closely in terms of having to provide a certain quantity of mitigation … so that in some sense can help in saying 'well this is our requirements'." (Respondent D commenting on a major urban development in Devon)

There is a danger of 'double counting' of ecosystem benefits. Respondent F noted that it can get confusing as to whether an ecosystem services measure is also serving as a biodiversity enhancement measure. In practice, developers will look to maximize the environmental benefits that can be gained from particular features on site. For example, Respondent G talked about surface water attenuation basins doubling as reed beds for biodiversity for a major development in Cornwall. Much uncertainty, therefore, remains about the application of ecosystem services in practice and the implications for biodiversity,

> "We get told to take on more and more [policy] streams and then it becomes increasingly difficult to deliver because you've got so many objectives." (Respondent B)

Aichi target 15 refers to the contribution of biodiversity to carbon stocks and therefore to climate change mitigation and adaption. This utilitarian objective is reflected in national strategies, "We do know that managing our biodiversity is important to both 'mitigation' (addressing the causes of climate change by removing greenhouse gases from the atmosphere) and 'adaptation' (helping to reduce the impacts of climate change)" (DEFRA 2011b, 16). Spatial planning policy recognizes the role of undeveloped land and GI in contributing to climate change mitigation and adaptation, a consideration that will only grow in importance, stating that planning policies and decisions should "recognize that some undeveloped land can perform many functions, such as for wildlife, recreation, flood risk mitigation, cooling/shading, carbon storage or food production" (MHCLG 2019, para. 118 b) while "New development should be planned for in ways that avoid increased vulnerability to the range of impacts arising from climate change … care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure" (MHCLG 2019, para. 150a).

As noted in Section 2, biodiversity, ecosystem services and natural capital lend themselves to quantitative, technical and scientific evidence gathering that sits well with existing practice within spatial planning. The role of scientists in providing knowledge or evidence to shape, support and monitor biodiversity policy is reflected in Aichi target 19. National strategies also highlight the role of evidence, "In England we are fortunate in having widely available information on the status and trends in biodiversity" (DEFRA 2011b, 33). The NPPF contains a general statement on the need for evidence to underpin planning policies, "The preparation and review of all policies should be underpinned by relevant and up to date evidence" (MHCLG 2019, para. 31). In the interviews, biodiversity was referred to as one of the "*clear cut scientific elements*" in planning (Respondent E). The introduction of net gain as a requirement using a biodiversity metric was welcomed for being measurable,

> "I endorse the quantified approach to net gain because it does at least give you something more clear to strive for because I think that's often the challenge with environmental matters, that it's quite qualitative and so it's [difficult] to say you're achieving your policy objectives." (Respondent B)

The same interviewee also recognized, however, that arguments around mitigation, ecosystems services and GI become so technical that other arguments for biodiversity are lost or overlooked,

"We've kind of sterilised it all into Green Infrastructure and SANGs and all these things that are quite complicated to engage everybody in." (Respondent B)

The above analysis highlights the way that biodiversity has been mainstreamed from the Aichi targets into spatial planning policy through the development of a two-pronged spatial strategy. Policy for protected sites follows a traditional, hierarchical approach, while policy for the wider countryside and urban areas follows an approach based on instrumental concepts of net gain, mitigation, offsetting and ecosystem services. The focus of the planning system on sustainable development places the overall approach firmly within an ecological modernization discourse.

6.   Discussion and conclusions

This paper has addressed three questions. How are the Aichi targets reflected in the English spatial planning framework? How central, or mainstream, has biodiversity become to the planning system in England and what are the challenges involved in 'mainstreaming' biodiversity in spatial planning? The analysis of biodiversity policy discourse has shown that the Aichi targets contain a mix of moral, instrumental and scientific storylines, but that the key focus is on sustainable development as an instrumental storyline that sits firmly within ecological modernization discourse. National strategies and planning policy acknowledge moral arguments to protect biodiversity (in relation to nature's 'intrinsic value' and shared responsibility) and use scientific arguments to justify protection for designated sites, priority habitats and species and ecological network features based on concepts of irreplaceability and connectivity. It is instrumental arguments, though, that form the dominant storyline based on sustainable development, particularly in relation to the wider countryside and urban areas where biodiversity considerations are traded off against development needs and framed as 'replaceable' assets. Mainstreaming has led to new geographies of biodiversity.

Three key challenges have been identified. First, the hierarchical approach to protected sites, with greatest regulatory and policy protection given for tier 1 and tier 3 sites, means that responsibility for protection of tier 2 sites (and to a lesser extent tier 1 LNRs) in spatial planning is given to LPAs, who are expected to develop strong local policies. In addition, the identification and protection of irreplaceable habitats (such as ancient woodland), while in theory extending protection of valued habitats, is also to a large extent subject to local policy. A stronger national policy statement in the NPPF in relation to protection of tier 2 sites (and tier 1 LNRs), as well as the protection of irreplaceable habitats, would strengthen their biodiversity status and protection and support local policy-making.

Second, tension between the treatment of protected sites, habitats and species and the wider countryside and urban areas in spatial planning policy is seen most starkly in relation to the umbrella concept of connectivity (in the form of corridors, networks, stepping stones and buffer zones). These spatial features could be interpreted as a new fourth tier of nature conservation (following Lawton's three tiers). Currently, however, the identification of connectivity features is delegated to the local level of plan-making. While the impending introduction of LNRSs may provide impetus to recognize connectivity features more formally, without stronger national policy or regulation, success will be dependent on the actions of local policy-makers and other key

actors at the local and sub-regional levels. The proposed introduction of a national bio-diversity net gain requirement to support the application of biodiversity offsetting measures will strengthen biodiversity considerations for individual developments in the wider countryside and urban areas while placing greater emphasis on nature as a replaceable asset. The overlap of biodiversity net gain with wider objectives for eco-system services and GI creates a danger of double-counting biodiversity benefits and other environmental gains, overloading LPAs with further environmental objectives and weakening biodiversity outcomes.

Third, the emphasis on connectivity will require more effective strategic spatial planning between LPAs at sub-regional level. Experience of effective joint working on biodiversity has developed around many of the tier 1 habitat sites. However, there are a number of challenges for LPAs in working together to develop strategic policies as outlined in this paper. A stronger policy statement in the NPPF on the status of con-nectivity sites and need for effective strategic planning could support better joint stra-tegic planning for biodiversity connectivity.

Finally, the limitations of spatial planning to support biodiversity should be rec-ognized. Spatial planning is a key influence on land use change, but has little influ-ence over agricultural or forestry practices, or over the management of protected sites. Spatial planning is therefore one cog in a wider framework of actors and insti-tutions at national and local levels that together will influence biodiversity trends in England.

The analysis has shed light on England's spatial planning response to the inter-national Aichi targets. It has demonstrated the English focus on connectivity as a strat-egy to protect and enhance biodiversity in addition to traditional site-based protection. The policy approach that has emerged in England sits firmly within an ecological modernization discourse that embraces instrumental approaches to balance nature con-servation and development. The paper has highlighted the delegation of many aspects of responsibility for biodiversity protection and enhancement in the wider countryside and urban areas to the local level of planning which is likely to lead to local conflicts over the definition of 'irreplaceable' and 'replaceable' nature in relation to particular sites and habitats and makes a strategic approach to planning for biodiversity enhance-ment hard to achieve. The findings presented in this paper reinforce the challenge of mainstreaming biodiversity, and of overcoming the 'responsibility gap' between high level biodiversity objectives set out by national government and the policies and prac-tices of other policy sectors such as spatial planning, reinforcing the findings of Sarkki *et al*. (2016).

Further research could explore the biodiversity storylines presented here, to test their wider acceptance and understanding by spatial planners and other actors involved in local and strategic plan-making and decision-taking. Research could also focus on approaches to planning for connectivity at strategic and local levels. Finally, as new international biodiversity targets are adopted in the future and the UK adapts to its position outside the EU, new biodiversity challenges will arise, with implications for spatial planning policy. Biodiversity as an international, national and local concern is only going to grow as biodiversity loss continues.

Disclosure statement

There is no potential conflict of interest.

ORCID

Olivia Wilson   http://orcid.org/0000-0001-6930-8976

References

Albrecht, J., J. Schumacher, and W. Wende. 2014. "The German Impact-Mitigation Regulation: A Model for the EU's No-Net-Loss Strategy and Biodiversity Offsets?" *Environmental Policy and Law* 44 (3): 317–332.

Apostolopoulou, E., and W. M. Adams. 2019. "Cutting Nature to Fit: Urbanisation, Neoliberalism and Biodiversity Offsetting in England." *Geoforum* 98: 214–225. doi:10.1016/j.geoforum.2017.05.013.

Bailey, I., and G. A. Wilson. 2009. "Theorising Transitional Pathways in Response to Climate Change: Technocentrism, Ecocentrism, and the Carbon Economy." *Environment and Planning A: Economy and Space* 41 (10): 2324–2341. doi:10.1068/a40342.

Baker, J., R. Hoskin, and T. Butterworth. 2019. *Biodiversity Net Gain: Good Practice Principles for Development: A Practical Guide*. London: CIRIA.

Bird Aware Solent. 2017. *Solent Recreation Mitigation Strategy*. Accessed 31 August 2020. https://solent.birdaware.org/media/29372/Bird-Aware-Solent-Strategy/pdf/Solent_Recreation_Mitigation_Strategy.pdf

Bradley, Q. 2021. "The Financialisation of Housing Land Supply in England." *Urban Studies* 58 (2): 389–404. doi:10.1177/0042098020907278.

Campbell, S. 2016. "Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of Sustainable Development." In *Readings in Planning Theory*, edited by S. Fainstein and J. Defilippis, 214–240. Chichester: Wiley.

Castree, N. 2008. "Neoliberalising Nature: The Logics of Deregulation and Reregulation." *Environment and Planning A: Economy and Space* 40 (1): 131–152. doi:10.1068/a3999.

Condon, J. 2020. "Biodiversity Offsetting and the English Planning System: A Regulatory Analysis." *Journal of Environmental Law* 32 (3): 529–557. doi:10.1093/jel/eqaa018.

Costanza, R., R. de Groot, L. Braat, I. Kubiszewski, L. Fioramonti, P. Sutton, S. Farber, and M. Grasso. 2017. "Twenty Years of Ecosystem Services: How Far Have we Come and How Far Do we Still Need to Go?" *Ecosystem Services* 28: 1–16. doi:10.1016/j.ecoser.2017.09.008.

Cowell, R. 1997. "Stretching the Limits: Environmental Compensation, Habitat Creation and Sustainable Development." *Transactions of the Institute of British Geographers* 22 (3): 292–306. doi:10.1111/j.0020-2754.1997.00292.x.

Cowell, R., and M. Lennon. 2014. "The Utilisation of Environmental Knowledge in Land Use Planning: Drawing Lessons for an Ecosystem Services Approach." *Environment and Planning C: Government and Policy* 32 (2): 263–282. doi:10.1068/c12289j.

DEFRA (Department for the Environment, Food and Rural Affairs), and Forestry Commission. 2005. *Keepers of Time: A Statement of Policy for England's Ancient and Native Woodlands*. London: DEFRA. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/778106/KeepersofTimeanw-policy.pdf

DEFRA. 2006. *Local Wildlife Sites: Guidance on Their Identification, Selection and Management*. London: DEFRA. https://webarchive.nationalarchives.gov.uk/20130402204735/http:/archive.defra.gov.uk/rural/documents/protected/localsites.pdf

DEFRA. 2007. *Conserving Biodiversity: The UK Approach*. London: DEFRA.

DEFRA. 2011a. *The Natural Choice: Securing the Value of Nature. Cm 8082*. London: HMSO.

DEFRA. 2011b. *Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services*. London: DEFRA.

DEFRA. 2014. *Review of Biodiversity Offsetting in Germany*. London: DEFRA.

DEFRA. 2018. *A Green Future: Our 25 Year Plan to Improve the Environment*. London: DEFRA. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

DEFRA. 2019. *UK Biodiversity Indicators Revised*. London: DEFRA.

Dryzek, J. S. 1997. *The Politics of the Earth: Environmental Discourses*. Oxford: OUP.

East Devon District Council. 2016. *East Devon Local Plan 2013 to 2031, Adopted 28 January 2016*. Sidmouth: East Devon District Council. https://eastdevon.gov.uk/media/1772841/local-plan-final-adopted-plan-2016.pdf

Figari, H. 2012. "The Ambivalent Nature of Biodiversity: Scientists' Perspectives on the Norwegian Nature Index." *Norsk Geografisk Tidsskrift – Norwegian Journal of Geography* 66 (5): 272–278. doi: 10.1080/00291951.2012.743170.

Francis, R. A., and M. K. Goodman. 2010. "Post-Normal Science and the Art of Nature Conservation." *Journal for Nature Conservation* 18 (2): 89–105. doi:10.1016/j.jnc.2009.04.002.

Goldberg, E., K. Kirby, J. Hall, and J. Latham. 2007. "The Ancient Woodland Concept as a Practical Conservation Tool in Great Britain." *Journal for Nature Conservation* 15 (2): 109–119. doi:10.1016/j.jnc.2007.04.001.

Hajer, M. A. 1995. *The Politics of Environmental Discourse: Ecological Modernisation and the Policy Process*. Oxford: OUP.

Harvey, D. 1999. "The Environment of Justice." In *Living with Nature: Environmental Politics as Cultural Discourse*, edited by M. A. Hajer and F. Fischer, 153–185. Oxford: OUP.

Healey, P. 2006. *Collaborative Planning: Shaping Places in Fragmented Societies*. 2nd ed. Basingstoke: Palgrave McMillan.

Keulartz, J. 1999. "Engineering the Environment: The Politics of Nature Development." In *Living with Nature: Environmental Politics as Cultural Discourse*, edited by M. A. Hajer and F. Fischer, 83–102. Oxford: OUP.

Lawton, J. 2010. *Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network*. London: DEFRA. https://webarchive.nationalarchives.gov.uk/20130402170324/http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf

Lennon, M., and M. Scott. 2014. "Delivering Ecosystems Services via Spatial Planning: Reviewing the Possibilities and Implications of a Green Infrastructure Approach." *Town Planning Review* 85 (5): 563–587. doi:10.3828/tpr.2014.35.

Masood, E. 2018. "The Battle for the Soul of Biodiversity." *Nature* 560 (7719): 423–425. doi: 10.1038/d41586-018-05984-3.

Merchant, C. 1999. "Partnership Ethics and Cultural Discourse: Women and the Earth Summit." In *Living with Nature: Environmental Politics as Cultural Discourse*, edited by M. A. Hajer and F. Fischer, 204–223. Oxford: OUP.

MHCLG (Ministry of Housing, Communities and Local Government). 2019. *National Planning Policy Framework. CP48*. London: HMSO.

Nature. 2020. "New Biodiversity Targets Cannot Afford to Fail." *Nature* 578: 337–338.

Natural England. 2012. *Natural England Designations Strategy (NE353)*. London: Natural England. http://publications.naturalengland.org.uk/publication/2647412

Natural England. n.d. *Explanatory Note Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 - Habitats and Species of Principal Importance in England*. London: Natural England. Accessed 31 August 2020. https://webarchive.nationalarchives.gov.uk/20140712055944/http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx

Owens, S. 1994. "Land, Limits and Sustainability: A Conceptual Framework and Some Dilemmas for the Planning System." *Transactions of the Institute of British Geographers* 19 (4): 439–456. doi:10.2307/622834.

Rose, D., P. Brotherton, S. Owens, and T. Pryke. 2018. "Honest Advocacy for Nature: Presenting a Persuasive Narrative for Conservation." *Biodiversity and Conservation* 27 (7): 1703–1723. doi:10.1007/s10531-016-1163-1.

Sarkki, S., J. Niemelä, R. Tinch, J. Jäppinen, M. Nummelin, H. Toivonen, and M. Weissenberg. 2016. "Are National Biodiversity Strategies and Action Plans Appropriate for Building Responsibilities for Mainstreaming Biodiversity across Policy Sectors? The Case of Finland." *Journal of Environmental Planning and Management* 59 (8): 1377–1396. doi:10.1080/09640568.2015.1076384.

Sullivan, S., and M. Hannis. 2015. "Nets and Frames, Losses and Gains: Value Struggles in Engagements with Biodiversity Offsetting Policy in England." *Ecosystem Services* 15: 162–173. doi:10.1016/j.ecoser.2015.01.009.

Thames Basin Heaths Joint Strategic Partnership Board. 2009. *Thames Basin Heaths Special Protection Area Delivery Framework*. Guildford: South East England Regional Assembly.

Therivel, R. 2009. "Appropriate Assessment of Plans in England." *Environmental Impact Assessment Review* 29 (4): 261–272. doi:10.1016/j.eiar.2009.01.001.

Uetake, T., K. Kabaya, K. Ichikawa, N. Moriwake, and S. Hashimoto. 2019. "Quantitative Analysis of National Biodiversity Strategy and Action Plans about Incorporating Integrated

Approaches in Production Landscapes." *Journal of Environmental Planning and Management* 62 (12): 2055–2079. doi:10.1080/09640568.2018.1530202.

UNEP (United Nations Environment Programme). 2010. *The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets.* UNEP/CBD/COP/DEC/X/2. https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf

UN (United Nations). 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development*. A/RE/70/1. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

Whatmore, S., and S. Boucher. 1993. "Bargaining with Nature: The Discourse and Practice of Environmental Planning Gain." *Transactions of the Institute of British Geographers* 18 (2): 166–178. doi:10.2307/622360.

Wilding, S., and J. Raemaekers. 2000. "Environmental Compensation: Can the British Planning Regime Learn from Germany?" *Planning Theory & Practice* 1 (2): 187–201. doi:10.1080/14649350020008404.

Wilson, E. 2009. "Multiple Scales for Environmental Intervention: Spatial Planning and the Environment under New Labour." *Planning Practice and Research* 24 (1): 119–138. doi:10.1080/02697450902742205.

Wilson, E. O. 1989. "Threats to Biodiversity." *Scientific American* 261 (3): 108–117. doi:10.1038/scientificamerican0989-108.

Wilson, O., and O. Hughes. 2011. "Urban Green Space Policy and Discourse in England under New Labour from 1997 to 2010." *Planning Practice and Research* 26 (2): 207–228. doi:10.1080/02697459.2011.560462.

Wynne, B. 1992. "Uncertainty and Environmental Learning: Reconceiving Science and Policy in the Preventive Paradigm." *Global Environmental Change* 2 (2): 111–127. doi:10.1016/0959-3780(92)90017-2.